UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,423	12/05/2003	Charles Edwin Thorn	10059US10	9407

23446 7590 01/24/2006

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

EXAMINER	
PATEL, ISHWARBHAI B	

ART UNIT	PAPER NUMBER
2841	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/728,423	THORN ET AL.	
	Examiner	Art Unit	
	Ishwar (I. B.) Patel	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-19,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-19,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/8/204*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continuation

1. This application is a continuation of application 09/954,486 filed on September 17, 2001. The examiner has reviewed the prior art used in the parent application. MPEP 2001.06(b).

Information Disclosure Statement

2. The information disclosure statement filed March 08, 2004 has been partly considered. Following arts are not considered, see 37 CFR 1.98 (a) (3) and 37 CFR 1.98 (a) (2)

Prior art B2: No English translation of relevant portion.

Prior art B7: Relevant English translation not legible.

Prior art C21, C27, C28, C30, C31, C32, C33: not dated.

Prior art C51: Abstract not legible.

Prior art C109: copy not found.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

Non-initialed and/or non-dated alterations have been made to the oath or

declaration. See 37 CFR 1.52(c).

The alterations in the residence addresses of the inventor not initialed / non-dated.

Drawings

4. The drawings are objected to because of the following: The top and bottom line should be continuous one without any breaks (the line should be continuous even in the regions of the holes). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. The abstract of the disclosure is objected to because the abstract is not clearly descriptive of the invention. The abstract should be directed to describe the invention. In the instant case it should be directed to the printed circuit board, rather than a method of applying a conductive coating. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minten (US Patent 4,684,560) in view of Randolph (US Patent No. 5,139,642) and Yoshida (US Patent No. 5,150,283).

Regarding claim 2, Minten discloses a printed wiring board comprising: at least two conductive circuit layers separated by nonconductive material; at least one recess in said nonconductive material defined by a non conductive surface intersecting at least two of said conductive circuit layer (printed circuit board with a non conductive through hole, column 4, line 50 to column 5, line 10,column 13, line 25-35); an electrically conductive coating on said nonconductive surface, said coating including electrically conductive carbon, wherein said coating is electrically conductive, allowing electrical

current to flow between the two conductive circuit layers, and accepts electroplating to provide a surface at least substantially free of visible void (carbon coating with a liquid dispersion medium, column 7, line 5-65,). Minten do not explicitly disclose the carbon having a mean particle size not greater than about 1 micron and a water dispersible organic binding agent. However, Minten discloses the carbon particle with an average particle diameter below about 3 microns, and further discloses a preferred range from 0.1 micron to about 2 micron, and discloses better results achieved by smaller carbon particle size, (column 7, line 5-20).

Randolph discloses a process for preparing a nonconductive substrate for electroplating and recites that it is preferred that the carbon black particles have an average particle diameter from about 0.05 to about 3.0 microns to obtain a desired plating characteristics of substantially even plating and no plating pullaways. Randolph further discloses use of graphite particle in addition to the carbon particle (column 22, line 53-58).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to use carbon particles having a mean particle size not greater than about 1 micron to have a desired plating characteristics of substantially even plating and no plating pullaways

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the circuit board of Minten with the mean carbon particle size not greater than about 1 micron in order to have better plating, as

taught by Randolph, in order to have a desired plating characteristics of substantially even plating and no plating pullaways.

Yoshida discloses coating of carbon using water-soluble binding agent, such as polysaccharides for better binding of the carbon particle, (column 2, line 10-25 and 39-50).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to use the water-soluble binding agent, such as polysaccharides for better binding of the carbon particle.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with water-soluble binding agent, such as polysaccharides, as taught by Yoshida, in order to have better binding of the carbon particle and resultant better and reliable plating.

Regarding claims 3-11, the modified board of Minten discloses all the features of the claimed inventions but does not disclose the resistivity between the conductive layers prior to electroplating as claimed in claims 3-11. However, the invention of Minten is to provide a carbon coating to have even plating with desired plating characteristic for better electric connection between two conductive layers separated by a nonconductive layer. Further, What will be the resistivity between the conductive layers before electroplating is a process limitation in a product claim. Such a process limitation defines the claimed invention over the prior art to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the

prior art, in the case that the product is same as, or obvious over the prior art. See Product-by-Process in MPEP § 2113 and 2173.05(p) and *In re Thorpe*, 777 F.2d 695, 227 USPQ 964, 966 (Fed. Cir. 1985). These are the structural claims and the modified board of Minten discloses the structure. Therefore, Minten meets the limitations.

Regarding claim 12, the modified board of Minten further includes multiple holes for electrical connection between various circuit layers (column 13, line 25-35).

Regarding claim 13-16, the modified board of Minten discloses all the features of the claimed inventions as applied to claim 2 above, but does not disclose the thickness of the coating layer, as claimed in claim 13-16. However, the thickness will depend upon the diameter of the carbon particles used and also, the thickness will be selected to have uniform coating to have resultant even plating. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with the thickness of the coating as claimed in claims 13-16 in order to have uniform coating to have resultant even plating based on the diameter of the carbon particle used.

Regarding claim 17, the modified board of Minten further discloses coating free of lumpiness (particle diameter and percentage adjusted to get uniform coating, column 9, line 5-60).

Regarding claim 18, the modified board of Minten further discloses said water dispersible organic binding agent is polysaccharides as applied to claim 2 above (Yoshida, column 2, line 10-25 and 39-50).

Regarding claim 19, the modified board of Minten further discloses the electrically conductive carbon comprise graphite as applied to claim 2 above (Randolph, column 22, line 53-58).

Regarding claim 21, the modified circuit board of Minten further discloses electroplating on electrically conductive coating in the recess (column 11, line 38-42).

Regarding claim 22, though the modified circuit board of Minten does not disclose solder deposition on the electroplated portion, such coating is known in the art for protecting the surface of circuits and holes during storage. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with solder deposition in the electroplated recess in order to protect the surface during storage.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 2-19 and 21-22 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,710,259 (hereafter Pat259). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

Regarding claim 2, claim 1 of Pat259 discloses a printed wiring board comprising (line 1): A. at least two conductive circuit layers separated by nonconductive material (line 2-3); B. at least one recess in said nonconductive material defined by a nonconductive surface intersecting at least two of said conductive circuit layers (line 4-6); C. an electrically conductive coating on said nonconductive surface, said coating including electrically conductive carbon (graphite) having a mean particle size not greater than about 1 micron and a water-dispersible organic binding agent, wherein said coating is electrically conductive, allowing electrical current to flow between the two conductive circuit layers, and accepts electroplating to provide a surface at least substantially free of visible voids (line 7-15). In the instant claim coating includes

electrically conductive carbon, whereas the claim 1 of Pat259 recites graphite. However, graphite is a form of carbon. Therefore, the claim of Pat259 meets the limitation.

Regarding claim 3, claim 2 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 1000 ohms prior to electroplating.

Regarding claim 4, claim 3 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 600 ohms, prior to electroplating.

Regarding claim 5, claim 4 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 400 ohms, prior to electroplating.

Regarding claim 6, claim 5 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 250 ohms, prior to electroplating.

Regarding claim 7, claim 6 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 80 ohms prior to electroplating.

Regarding claim 8, claim 7 of Pat259 discloses a resistivity of less than about 60 ohms between said conductive circuit layers, prior to electroplating.

Regarding claim 9, claim 8 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 30 ohms, prior to electroplating.

Regarding claim 10, claim 9 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 10 ohms, prior to electroplating.

Regarding claim 11, claim 10 of Pat259 discloses a resistivity between said conductive circuit layers of less than about 2 ohms, prior to electroplating.

Regarding claim 12, claim 11 of Pat259 discloses a multiplicity of said conductive through holes including said coating.

Regarding claim 13, claim 12 of Pat259 discloses said coating is not greater than about 12 microns thick.

Regarding claim 14, claim 13 of Pat259 discloses said coating is not greater than about 7 microns thick.

Regarding claim 15, claim 14 of Pat259 discloses said coating is not greater than about three microns thick.

Regarding claim 16, claim 15 of Pat259 discloses said coating is not greater than about one micron thick.

Regarding claim 17, claim 16 of Pat259 discloses said coating is free of lumpiness.

Regarding claim 18, claim 17 of Pat259 discloses said water-dispersible organic binding agent is selected from the group consisting of monosaccharides, polysaccharides, and combinations thereof.

Regarding claim 19, claim 2 of Pat259 discloses said electrically conductive carbon comprises graphite.

Regarding claim 21, claim 18 of Pat259 discloses an electroplated layer deposited on at least a portion of said electrically conductive coating.

Regarding claim 22, claim 19 of Pat259 discloses comprising a solder layer deposited on at least a portion of said electroplated layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IBPatel

Ishwar (I. B.) Patel
Patent Examiner
Art Unit: 2841
January 20, 2006